

Serial No. 10/720,328Page 9

REMARKS

Claims 1 – 11, 16 – 33, 35 and 40 - 46 are presently pending. Claims 1 – 8 and 25 – 32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Crow (3,924,201) in view of Tanuma (JP06037368). Claims 9 – 24 and 33 – 46 have been allowed.

The Examiner's indication of allowed Claims is gratefully acknowledged. For the reasons set forth below, Applicants respectfully submit that all of the Claims presently pending should be allowed. Accordingly, reconsideration, allowance and passage to issue are respectfully requested.

The present invention addresses the need in the art for a laser resonator that produces uniformly high beam quality in both transverse dimensions with a compact high aspect slab lasing medium that also addresses the problem of generating short-duration Q-switched pulses in a low-Fresnel number resonator, where the length of the resonator is determined by mode discrimination associated with the narrow dimension of the high-aspect slab.

The need in the art is addressed by the apparatus and method of the present invention. In the illustrative embodiment, the apparatus includes means for providing a collimated beam of electromagnetic energy with a predetermined orientation with respect to a line of sight thereof and means for rotating the beam such that a transverse mode selection therefor is the same for two orthogonal directions thereof. The invention is set forth in Claims of varying scope of which Claim 1 is illustrative. Claim 1 recites:

1. An apparatus comprising:

first means including a gain medium for providing a collimated beam of electromagnetic energy with a predetermined orientation with respect to a line of sight thereof, and

second means for rotating said beam such that a transverse mode selection therefor relative to said gain medium is the same for two orthogonal directions thereof. (Emphasis added.)

None of the references, taken alone or in combination, teach, disclose or suggest the invention as presently claimed. That is, none of the references teach or suggest an

Serial No. 10/720,328Page 10

apparatus with **means for rotating a collimated beam such that a transverse mode selection therefor relative to a gain medium is the same for two orthogonal directions thereof.**

However, in the above-noted Office Action, the Examiner cited Crow and Tanuma and suggested that in combination these references teach the invention as claimed. Specifically, the Examiner asserts that Crow teaches a porro prism 16 for rotating a beam such that a transverse mode selection therefor is the same for two orthogonal directions therof. However, this assertion is not supported by the reference.

Crow's gain medium is a rod, the cross-section of Crow's gain medium is **symmetrical**. As is well known in the art, inasmuch as there are no defined orthogonal directions in a rod geometry, no mechanism is provided to effect a **transverse mode selection**. Hence, the reference clearly does not teach or suggest means for rotating a beam such that a **transverse mode selection therefor is the same for two orthogonal directions thereof**.

In accordance with the present teachings, the use of an **asymmetric slab** facilitates **transverse mode selection** inasmuch as the thin dimension of the slab serves as a limiting aperture for the beam in the successive passes thereof. Hence, the geometry of the invention is significant in this regard. In any event, Crow clearly does not teach, disclose or suggest an apparatus with **means for rotating a collimated beam such that a transverse mode selection therefor is the same for two orthogonal directions thereof** as presently claimed.

The Examiner suggests that Crow teaches a rotation of the beam such that a **transverse mode selection therefor is the same for two orthogonal directions defined by the longitudinal axis of the medium (rod 12) and the beam output by the beam splitter 24**. However, in addition to the shortcoming identified above, Crow also fails to teach the invention as claimed with respect to orthogonal directions defined relative to the gain medium of the apparatus.

Moreover, the shortcomings of Crow are not overcome by the teachings of Tanuma as Tanuma does not teach or suggest an arrangement for rotating a beam to effect a **transverse mode selection therefor**.

Serial No. 10/720,328Page 11

Accordingly, reconsideration, allowance and passage to issue are respectfully requested.

Respectfully submitted,
Robin A. Reeder *et al.*

By 

Leonard A. Alkov, Esq.
Attorney for Applicants
Registration No. 30,021

Raytheon Company
EO/E4/N119
P.O. Box 902
El Segundo, CA 90245

(310) 647-2577
(310) 647-2616 facsimile